

**SYSTEM AND METHOD FOR MEASURING**  
**WAVE DIRECTIONAL SPECTRUM AND WAVE HEIGHT**

Abstract of the Disclosure

5           A system and method for measuring the directional spectrum of one or more waves in a fluid medium using a multi-beam sonar system. In an exemplary embodiment, range cells located within a plurality of acoustic beams are sampled to provide current velocity data. Optionally, wave surface height and pressure data is obtained as well. This velocity, wave height, and pressure data is Fourier-transformed by one or more signal  
10           processors within the system, and a surface height spectrum produced. A cross-spectral coefficient matrix at each observed frequency is also generated from this data. A sensitivity vector specifically related to the ADCP's transducer array geometry is used in conjunction with maximum likelihood method (MLM), iterative maximum likelihood method (IMLM), or other similar methods to solve a the wave equation at each frequency  
15           and produce a frequency-specific wave directional spectrum. Ultimately, the frequency-specific spectra are combined to construct a complete two-dimensional wave directional spectrum. The system is also capable of measuring current profile as a function of depth in conjunction with wave direction and wave height.

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